

1. Composition comprising Me, Si_3N_4 , and a sintering aid wherein Me is a member selected from the group consisting of Groups IVB, VB, VIB and VIII of the periodic table, said Me being present in an amount of between about 40-80 atomic percent, said Si_3N_4 being present in an amount of between about 60 and 20 atomic percent, with the combined atomic percent of said Me and Si_3N_4 being 100 atomic percent; said sintering aid being chosen from the group of MgO and SiO and being present in an amount of between about 0.05-30 weight percent based on the weight of said Si_3N_4 .
2. Composition as recited in claim 1 wherein Me is selected from W, Ta, Nb, Zr, Hf, Pt, Ir, Mo and Ru.
3. Composition as recited in claim 2 wherein said sintering aid is MgO and Me is W.
4. Sputter target comprising Me, Si_3N_4 and a sintering aid wherein Me is a member selected from the group consisting of groups IVB, VB, VIB and VIII of the periodic table, said Me being present in an amount of between about 40-80 atomic percent, said Si_3N_4 being present in an amount of between about 60 and 20 atomic percent, with the combined atomic percent of said Me and Si_3N_4 being 100 atomic percent; said sintering aid being chosen from the group of MgO and SiO and being present in an amount of between about 0.05-30 weight percent based on the weight of said Si_3N_4 .
5. Sputter target as recited in claim 4 wherein Me is selected from W, Ta, Nb, Zr, Hf, Pt, Ir, Mo and Ru.
6. Sputter target as recited in claim 5 wherein said sintering aid is MgO and Me is W.
7. Sputter target comprising W, Si_3N_4 and MgO present as a sintering aid, said W being present in an amount of between about 40-80 atomic percent, said Si_3N_4

-7-

being present in an amount of between about 60 and 20 atomic percent, with the combined atomic percent of said W and Si₃N₄ being 100 atomic percent; said MgO being present in an amount of between 0.05-30 weight percent based on the weight of said Si₃N₄.

8. Sputter target as recited in claim 7 having a density of at least 95% of theoretical density.

9. Sputter target as recited in claim 8 wherein W is present in an atomic amount of about 60 percent, said Si₃N₄ is present in an amount of about 40 atomic percent and said MgO is present in an amount of about 0.05-6 weight percent based on the weight of said Si₃N₄.

10. Sputter target as recited in claim 9 having a bulk density of between about 6.9 and 7.3 g/cc.

11. Sputter target as recited in claim 9 having a purity greater than 99.9%.

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13. Sputter target as recited in claim 9 having a Nitrogen content of between about 12.3-13.3 weight percent and a Silicon content of between about 19 and 21 weight percent silicon.

14. Method of making a sputter target comprising:

- a) providing an Me powder comprising a member selected from groups IVB, VB, VIB and VIII of the periodic table;
- b) providing Si₃N₄ powder;
- c) providing a sintering aid selected from MgO and SiO;
- d) blending said Me powder, Si₃N₄ powder and sintering aid to form a blend;

-8-

e) pressure consolidating said blend under heated conditions for a time sufficient to form a consolidated blend having an actual density of greater than 95% of the theoretical density;

15. Method as recited in claim 14 further comprising machining said pressure consolidated blend from said step (e) to final desired shape.

16. Method as recited in claim 14 wherein said blend comprises from about 40 - about 80 atomic percent Me, about 60 - about 20 atomic percent Si_3N_4 with said the atomic percent of said Si_3N_4 and said Me equaling about 100 atomic percent, said sintering aid being MgO present in an amount of between about 0.05-6 weight percent based on the weight of said Si_3N_4 .

17. Method as recited in claim 16 wherein Me is W.

18. Method as recited in claim 16 further comprising conducting said pressure consolidating step (e) in an inert gaseous atmosphere.

19. Method as recited in claim 18 wherein said pressure is greater than about 1 atmosphere.

20. Method as recited in claim 19 wherein pressure consolidation is conducted at temperatures of about 900°C-1700°C.